CLAIMS:

What is claimed is:

1. An apparatus for transporting a flat object from one position to another position comprising:

an end effector having a base portion and at least one finger extending from the base portion, the finger having a top surface and a bottom surface and the finger including a free end, and wherein the top surface includes a substantially flat portion extending from the base portion, and wherein the finger includes a tapered portion extending from the substantially flat portion towards the free end.

2. An apparatus as set forth in claim 1 wherein the tapered portion includes an angled surface formed at an angle ranging from about 2-8 degrees with respect to the substantially flat portion.

3. An apparatus as set forth in claim 1 wherein thickness of the finger between the substantially flat portion of the bottom surface ranges from about 1.8-1.95 mm.

4. An apparatus as set forth in claim 1 wherein only a single finger extends from the base portion.

5. An apparatus as set forth in claim 1 having at least two spaced apart fingers extending from the base portion.

6. An apparatus as set forth in claim 1 wherein the tapered portion includes an angled surface formed at an angle ranging from about 4-5 degrees with respect to the substantially flat portion .

7. An apparatus as set forth in claim 1 wherein the length of the tapered portion ranges from about 3-8 mm .

8. An apparatus as set forth in claim 1 wherein the finger further includes a vacuum port hole formed therein for drawing a vacuum therethrough and gripping a flat object .

9. An apparatus as set forth in claim 1 wherein the end effector is made from a material comprising a ceramic.

10. An apparatus as set forth in claim 9 wherein the ceramic comprises at least one of alumina and silicon carbide.

11. An apparatus as set forth in claim 1 wherein the end effector is made from material comprising a metal.

12. An apparatus as set forth in claim 11 wherein the metal comprises aluminum.

13. An apparatus as set forth in claim 1 further comprising a robot having a robot arm, and wherein the end effector is attached to an end of the robot arm, and wherein the robot is constructed and arranged to move the end effector in a plurality of directions.

14. An apparatus comprising:

a robot having a robot arm for movement in a plurality of directions, and an end effector secured to an end of the robot arm;

a wafer cassette housing having an first and second side walls and a plurality of spaced apart ledges extending inwardly from each of the side walls constructed and arranged so that corresponding ledges on each side wall are positioned to support a semiconductor wafer, and the housing having a front face with an opening formed therein for loading and unloading the cassette housing with semiconductor wafers;

at least two spaced apart adjacently positioned semiconductor wafers supported by corresponding ledges extending inwardly from the first and second side walls of the wafer cassette housing to define an opening between adjacently positioned semiconductor wafers;

an end effector having at least one extension and wherein each extension includes a top surface and a bottom surface and the extension having a free end, and the top surface having a substantially flat portion, and a tapered portion extending from the substantially flat portion towards the free end, and wherein the thickness of the extension between the substantially flat portion and the bottom surface is about 0.05-0.2 mm less than the opening between the adjacently positioned semiconductor wafers in the cassette housing.

15. An apparatus as set forth in claim 14 wherein the tapered portion includes an angled surface formed at an angle ranging from about 2-8 degrees with respect to the substantially flat portion .

16. An apparatus as set forth in claim 14 wherein the tapered portion includes an angled surface formed at an angle ranging from about 4-5 degrees with respect to the substantially flat portion .

17. An apparatus as set forth in claim 14 further comprising a second extension and wherein the extensions are spaced apart from each other.

18. An apparatus as set forth in claim 14 wherein the length of the tapered portion ranges from about 3-8 mm.

19. An apparatus for transporting a flat object from one position to another position comprising:

an end effector having a base portion and a pair of spaced apart fingers each extending from the base portion, each finger having a top surface and a bottom surface and each finger including a free end, and wherein the top surface includes a substantially flat portion extending from the base portion, and wherein each finger includes a tapered portion extending from the substantially flat portion towards the free end.

20. An apparatus as set forth in claim 19 wherein the tapered portion includes an angled surface formed at an angle ranging from about 2-8 degrees with respect to the substantially flat portion.